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EXAMINER	
STRZELECKA, TERESA E	
ART UNIT	**PAPER NUMBER**
1637	
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/677,690	Applicant(s) VO-DINH, TUAN	
	Examiner Teresa E. Strzelecka	Art Unit 1637	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on 29 June 2007.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) 1-21 and 34-39 is/are pending in the application.

4a) Of the above claim(s) 16-20 is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) 1-14,21 and 34-39 is/are rejected.

7)☒ Claim(s) 15 is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on June 29, 2007 has been entered.

2. Claims 1-21 were previously pending, with claims 16-20 withdrawn from consideration. Applicant amended claims 1, 3 and 10 and added new claims 34-39. Claims 1-15, 21 and 34-39 will be examined.

3. Applicant's amendments overcame the objection to claim 3 presented in the previous office action. All other previously presented rejections are maintained for reasons given in the "Response to Arguments" below.

Response to Arguments

4. Applicant's arguments filed June 29, 2007 have been fully considered but they are not persuasive.

Regarding the rejection of claims 1-4, 7-14 and 21 under 35 U.S.C. 102(b) as anticipated by Dubertret et al. as evidenced by Lakowicz and the rejection of claims 5 and 6 under 35 U.S.C. 103(a) over Dubertret et al. and Mirkin et al., Applicant argues that the newly added limitation of a nanoparticle having nanostructured outer surface that is SERS active overcomes the rejections, as the largest particles of Dubertret et al. are 1.4 nm in diameter, therefore they would not exhibit SERS enhancement.

However, Dubertret et al. teach much larger metal particles. They teach metal particles comprising up to 10^7 metal atoms (page 13, line 20). As evidenced by Schulte et al. on page 1355, second paragraph (IEEE International Symposium on Biomedical Imaging: Macro to Nano, pp. 1354-1356, April 2004), 3x 10^5 gold atoms give a nanoparticle with 10 nm diameter, therefore a nanoparticle with 10^7 atoms would be around 100 nm in diameter, therefore, of sufficient size to inherently exhibit nanostructured outer surface and therefore SERS enhancement.

The rejections are maintained.

Claim Interpretation

5. The term “elemental metal” has not been defined by Applicant, therefore it is considered as any metal.

6. The term “nanoparticle” is interpreted as any size particle, since Applicant did not define it.

7. The preamble “surface-enhanced Raman spectroscopy molecular probe” is not given any weight, since it does not introduce any structural constraints on the claimed product.

8. The limitations of “pin loop” and “stem” were not defined by Applicants. Therefore they are interpreted as any parts of a nucleic acid molecule capable of adopting a single-stranded and base-paired configurations, respectively.

9. The term “SERS label” was not defined by Applicant, therefore it is interpreted as any label.

10. The limitation “a first stem attached to one end of said pin loop having at least one SERS active label attached thereto” is interpreted as the label attached to either the stem or the loop”,

and the limitation "a second stem attached to the other end of said pin loop and said nanoparticle" is interpreted as the nanoparticle attached to either the stem or the loop.

11. Applicant did not define the term "gene", therefore any nucleic acid is considered as anticipating this term.

12. The preamble to claim 10 "A Raman detection system" is not taken into account when comparing the claim with prior art, since it does not result in a structural limitation for the claim.

13. The limitation of claim 11 "detection system communicably connected to said SMP" has not been defined in structural terms, therefore any detection system anticipates this limitation.

Claim Rejections - 35 USC § 102

14. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

15. Claims 1-4, 7-14, 21 and 34-39 are rejected under 35 U.S.C. 102(b) as being anticipated by Dubertret et al. (WO 02/18951; cited in the previous office action) as evidenced by Lakowicz (Principles of Fluorescence Spectroscopy, Second Edition, pp. 25-61, 1999; cited in the previous office action), Schulte et al. (IEEE International Symposium on Biomedical Imaging: Macro to Nano, pp. 1354-1356, April 2004), and Nie et al. (Science, vol. 275, pp. 1102-1106, 1997; cited in the IDS).

Regarding claims 1, 9, 10 and 34-39, Dubertret et al. teach an oligonucleotide-based molecular probe, the probe comprising:

at least one solid nanoparticle comprising an elemental metal, said nanoparticle having a nanostructured outer surface that is SERS active (Fig. 1B; page 5, lines 14-24; page 6, lines 1-15; Dubertret et al. teach that the metal particles can contain from 3 to to 10^7 metal atoms (page 13, line 20). As evidenced by Schulte et al. on page 1355, second paragraph, 3x 10^5 gold atoms give a nanoparticle with 10 nm diameter, therefore a nanoparticle with 10^7 atoms would be around 100 nm in diameter, therefore, of sufficient size to inherently exhibit nanostructured outer surface. Such particles would inherently provide SERS enhancement, as evidenced by Nie et al., where particles with average diameter of 35 nm (page 1102, last paragraph) provided SERS enhancement of up to 10^{15} (page 1104, last paragraph).), and

at least one pin loop, said pin loop including a loop sequence complementary to at least one target sequence, a first stem attached to one end of said pin loop having at least one SERS active label attached thereto and a second stem attached to the other end of said pin loop and said nanoparticle, wherein said probe generates a stronger SERS signal upon irradiation with excitation radiation when not bound to said target sequence as compared to a SERS signal following hybridization of said probe with said target sequence (Fig. 1B; page 4, lines 16-24; page 5, lines 14-24; page 6, lines 1-15). Since rhodamine 6G is a SERS label, the molecular beacon will inherently have stronger SERS signal in the closed form than in the open form).

Regarding claims 2 and 3, Dubertret et al. teach metal films and metal particles (page 3, lines 16-19).

Regarding claim 7, Dubertret et al. teach multiple fluorescent labels with different emission characteristics (page 11, lines 3, 4).

Regarding claim 8, Dubertret et al. teach Cu, AG or Au (page 9, lines 3-9).

Regarding claims 10 and 11, Dubertret et al. teach a spectrofluorometer comprising a light source and the molecular beacons (page 25, lines 18-24; page 26, lines 1-9).

Regarding claims 4, 12, 14 and 21, Dubertret et al. teach multiple beacons bound to a solid metal surface (page 20, lines 16-22), therefore they inherently teach multiple loops attached to a substrate.

Regarding claim 13, Dubertret et al. teach a spectrofluorometer (page 25, line 18). As evidenced by Lakowicz, every spectrofluorometer possesses a detection system which is either a photomultiplier (page 41, last two paragraphs; page 42-46; page 47, first paragraph), photodiode (page 47, second paragraph), avalanche diode (page 47, third paragraph) or a CCD detector (page 47, paragraphs 4-5).

Claim Rejections - 35 USC § 103

16. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

17. Claims 5 and 6 are rejected under 35 U.S.C. 103(a) as being unpatentable over Dubertret et al. (WO 02/18951; cited in the previous office action), as evidenced by Schulte et al. (IEEE International Symposium on Biomedical Imaging: Macro to Nano, pp. 1354-1356, April 2004), and Nie et al. (Science, vol. 275, pp. 1102-1106, 1997; cited in the IDS), and Mirkin et al. (U.S. Patent No. 6,417,340 B1; cited in the previous office action).

A) Dubertet et al. teach molecular beacons attached to gold nanoparticles, but do not teach plurality of nanoparticles bound to each other.

B) Mirkin et al. teach oligonucleotides bound to gold nanoparticles to detect nucleic acids (Abstract). In one of the embodiments, Mirkin et al. teach detection of nucleic acid analytes with nanoparticle clusters, where the nanoparticles are bound to each other with DNA molecules (Fig. 28; col. 12, lines 20-24; col. 26, lines 61-67; col. 27, lines 1-62).

It would have been *prima facie* obvious to one of ordinary skill in the art at the time of the invention to have used the aggregate probes of Mirkin et al. in the method of analyte detection of Dubertet et al. The motivation to do so, provided by Mirkin et al., would have been that using the aggregate probes enabled enhancement of target detection (col. 27, lines 31-35).

18. No references were found teaching or suggesting claim 15. Claim 15 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Teresa E. Strzelecka whose telephone number is (571) 272-0789. The examiner can normally be reached on M-F (8:30-5:30).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Gary Benzion can be reached on (571) 272-0782. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Teresa E Strzelecka
Primary Examiner
Art Unit 1637

Teresa Strzelecka
10/4/07